MILLSTONE 1

POST SHUTDOWN DECOMMISSIONING ACTIVITIES

REPORT

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TABLE OF CONTENTS **PAGE**

I. INTRODUCTION 3

II. OVERVIEW OF THE PSDAR 3

III. DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES 5

IV. SCHEDULE FOR DECOMMISSIONING ACTIVITIES 12

V. DECOMMISSIONING COST ESTIMATE 13

VI. ENVIRONMENTAL IMPACTS 14

VII. REFERENCES 18

Figure IV-1: Decommissioning Schedule

I. INTRODUCTION

Under the provisions of 10CFR50.82(a)(4)(i), Northeast Nuclear Energy Company (NNECO) hereby submits this Post Shutdown Decommissioning Activities Report (PSDAR) to describe the Millstone 1 planned decommissioning activities and schedule, provide a preliminary cost estimate, and discuss the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities are bounded by the appropriately issued environmental impact statements (EIS), specifically NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities" [Reference 1] and the Millstone Nuclear Power Station Final Environmental Statement [Reference 4]. This report is based upon the best information currently available and the plans discussed may be modified as additional information becomes available or conditions change.

Millstone 1 was shutdown on November 4, 1995 and has not operated since. On November 19, 1995 transfer of all fuel assemblies from the reactor vessel into the spent fuel pool (SFP) for storage was completed. On July 17, 1998 the Northeast Utilities Board of Trustees decided to permanently cease further operation of the plant. Certification to the Nuclear Regulatory Commission of the permanent cessation of operation and permanent removal of fuel from the reactor vessel, in accordance with 10CFR50.82 (a)(1)(i) & (ii), was filed on July 21, 1998 [Reference 5], at which time the 10CFR50 license no longer authorized operation of the reactor or placement of fuel in the reactor vessel.

II. OVERVIEW OF THE PSDAR

The objectives of the Millstone 1 decommissioning are to perform the work safely, to ensure that no adverse interactions occur with the operating units during decommissioning, and to complete the work in a cost effective manner.

Specific conditions which are unique to the multi-unit Millstone Station will require that certain Unit 1 decommissioning activities be delayed and performed concurrently with the decommissioning of Units 2 and 3. Other considerations may dictate early scheduling of certain decommissioning activities. Therefore, the approach to decommissioning Millstone 1 can best be described as a Modified SAFSTOR. In this approach, decontamination and dismantlement activities may be undertaken early in the decommissioning wherever it makes sense from a safety or economic viewpoint. For instance, given the future uncertainty over access to a low level waste disposal site, early shipment of certain components may be appropriate. The amount of decommissioning work completed prior to a SAFSTOR period will depend upon a number of factors currently under evaluation. It is also conceivable that, upon further evaluation, a full DECON approach may be preferable with the appropriate transfer of systems shared with the other units, to control under the applicable unit(s). The plant will be maintained in a condition that initially maintains the spent fuel in the SFP.

Both the DECON and the SAFSTOR options are approaches found acceptable to the NRC in its Final Generic Environmental Impact Statement (EIS) [Reference 1]. The Modified SAFSTOR approach is described in the following sections. The planned decommissioning activities and the general timing of their implementation are described in Section III. The overall decommissioning schedule and the potential implementation of an independent spent fuel storage installation (ISFSI) are found in Section IV. The preliminary cost estimate is given in Section V and a discussion that provides the reasons for concluding that the environmental impacts associated with decommissioning Millstone 1 are bounded by previous EIS is given in Section VI.

Completion of the decommissioning schedule is contingent upon three key factors:

- continued access to licensed low level waste (LLW) disposal sites,
- removal of spent fuel from the site, and
- timely funding of the decommissioning activities.

Currently Millstone 1 has access to Chem-Nuclear Systems' Barnwell, S.C. disposal site and to the Envirocare disposal site in Tooele County, Utah. Escalation costs for the disposal of waste have been incorporated into financial planning. Additionally, Millstone 1 has considered the possibility that during the decontamination and dismantlement phases, access to the Barnwell low level waste disposal site could be denied or that the facility could be closed.

When Millstone 1 operations ceased, the Decommissioning Fund had accumulated sufficient funds to cover approximately one third of the preliminary cost estimate to complete the work. Additional funds will be collected while decommissioning activities are performed. The preliminary cost estimate and collection schedule are consistent with the Modified SAFSTOR approach to decommissioning Millstone 1.

Consistent with 10CFR50.82(c), Millstone 1 will address any funding shortfall that may arise due to collection of insufficient funds. The following two options are available to resolve the shortfall and will be pursued if needed: 1) request approval to accelerate collection of payments into the fund, and 2) finance the temporary shortfall once the Millstone 1 ratemaking case is completed.

The unavailability of the DOE high level waste repository may affect the decontamination and dismantlement schedule for Unit 1. Delays in the operation of the repository have resulted in a significant increase in the cost of decommissioning and, depending on the decommissioning option chosen, may require the use of an ISFSI.

Under any eventuality such as unavailability of a low level waste disposal site, temporary shortfall in decommissioning funding, or other unforeseen circumstances, 10CFR50.82 requires Millstone 1 maintain the capability to suspend decontamination and dismantlement. Should such conditions arise, Millstone 1 will be prepared to suspend dismantlement and maintain the facility in a safe storage condition with appropriate funding.

III. DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES

Millstone 1 is currently planning to decommission using a Modified SAFSTOR approach in which the decontamination and dismantlement of the systems, components, plant structures and facilities (i.e. DECON) may be completed prior to and following a SAFSTOR period. In this plan, an ISFSI could be constructed and the transfer of spent fuel from the SFP could be completed before a SAFSTOR period. The SAFSTOR period would end with decontamination and dismantlement of any remaining systems, structures, and components and would commence in coordination with Unit 2 and Unit 3 decommissioning.

Spent fuel shipments from the ISFSI to DOE could be scheduled as soon as practicable following the repository commencing operations which is currently scheduled to be 2010. Delays in the operation of the repository will limit the transfer of fuel and increase the cost of long term spent fuel storage.

The following discussion provides an outline of the current decommissioning plan and the significant activities. The planning required for each decommissioning activity, including the selection of the process to perform the work, will be completed prior to the start of work for that activity.

A. Planning

Planning includes the preparation of licensing and design basis change documents and the PSDAR. Additionally, implementation of a site characterization plan, preparation of a detailed decommissioning plan, and the engineering development of task work packages would be accomplished. The detailed engineering required to support the decontamination and dismantlement of systems, structures, and components will be performed prior to the start of field activities.

General planning and preparation for decommissioning includes the following activities:

- Review and revise plant licensing basis documents as necessary, consistent with cessation of power operations. These documents include the Defueled Safety Analysis Report and the Technical Specifications.

- Develop a decommissioning organizational structure and select project staff.

- Identify the Unit 1 systems shared by Units 2 and 3 and revise the designs and the operation of these systems to isolate Unit 1 from Units 2 and 3.

- Review and reclassify systems, structures, and components consistent with cessation of power operations.

- Review and revise plant programs and procedures as necessary to be consistent with cessation of power operations.

- Prepare a plan for the spent fuel pool cleanup.

- Design and implement a spent fuel pool cooling system which is isolated from the remainder of the plant.

- Evaluate and choose a dry fuel storage system, if pursued. Investigate and prepare for the design and licensing of an ISFSI and prepare procurement specifications for a fuel canister system and various ancillary equipment.

B. Site Characterization

During the initial portion of the planning period a detailed site characterization will be undertaken during which radiological, regulated and hazardous wastes will be identified, categorized, and quantified. Surveys will be conducted to establish the contamination and radiation levels throughout the Unit 1 portion of the site. This information will be used in developing procedures to ensure that hazardous, regulated or radiologically contaminated materials are removed and to ensure that worker exposure is maintained as low as reasonably achievable (ALARA). Selected surveys of the outdoor areas in the vicinity of Unit 1 may be performed, although a detailed survey of the environs would likely be deferred pending decommissioning of Units 2 and 3. It is worthwhile to note that site characterization is a process that continues throughout decommissioning. As decontamination and dismantlement work proceeds, surveys will be conducted to maintain current characterization and that decommissioning activities are adjusted accordingly.

The activation analysis of the reactor internals, the reactor vessel, and the biological shield wall will be undertaken as a part of the site characterization. Using the results of this analysis, these components will be classified in accordance with 10CFR61 and will form the basis for the detailed plans for

their packaging and disposal. The material which is found to be greater than Class C (GTCC) will be stored with the spent fuel and potentially in an ISFSI prior to shipment.

C. Decontamination

The objectives of the decontamination effort are two-fold. First, to reduce the radiation levels throughout the facility in order to minimize personnel exposure during dismantlement. Second, to clean as much material as possible to unrestricted use levels, thereby permitting non radiological demolition and minimizing the quantities of material that must be disposed of by burial as radioactive waste.

The need to decontaminate structures, systems, and components will be determined by the schedule to dismantle them and by plant conditions. Early dismantling of contaminated components and systems may benefit from decontamination activities by reducing the radiation exposure to the workforce. Late dismantling may not require the components and systems to be decontaminated since the decay of the radiation sources will reduce the radiation levels by significant amounts.

Chemical decontamination of the Reactor Recirculation system may provide value through reduced worker dose. An evaluation will be performed to determine whether the expected reduction in the accumulated workforce exposure is justified by the costs associated with the decontamination. The evaluation results will be sensitive to the amount and type of work to be performed prior to a SAFSTOR period. Any decontamination method used will employ established processes with well understood chemical interactions. The resulting waste will be disposed of in accordance with plant procedures and applicable regulations.

The second objective of the decontamination effort will be achieved by decontaminating structural components including steel framing and concrete surfaces. The methods to accomplish this are mechanical, requiring the removal of the surface or surface coating, and are used regularly in industrial and contaminated sites.

D. Waste Management

A major component of the total cost of decommissioning Millstone 1 is the cost of packaging and disposing of systems, components and structures, contaminated soil, water and other plant process liquids. A Waste Management Plan will be developed to incorporate the most cost effective disposal strategy consistent with regulatory requirements for each waste type. The Waste Management Plan will be based on the evaluation of available methods and strategies for processing, packaging, and

transporting radioactive waste in conjunction with the available disposal facility options and associated waste acceptance criteria.

E. Major Decommissioning Activities

As defined in 10CFR50.2 a "major decommissioning activity" is “any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components for shipment containing greater than Class C waste in accordance with 10CFR61.55.” The following discussion provides the activities currently planned. As discussed earlier, these activities may be modified as conditions dictate.

The initial major decommissioning activities will be the removal of the drywell head and removal of the reactor vessel internals by segmentation. The drywell head would be sectioned and sent to a metal processor. The internals comprising the core shroud, core support structure, fuel guide plate, and upper portions of the control rod guide tubes may be GTCC waste which will be segmented, packaged into fuel bundle sized containers, and transferred to the SFP or ISFSI for storage and eventual disposal with the fuel. Using this approach all internals will be packaged and disposed of independent of the reactor vessel. When the internals segmentation effort is completed, the reactor vessel will be drained and any remaining debris removed. Without the internals present, several options are available for later removal and disposal of the reactor vessel: segmentation, sectioning into larger pieces, or disposal as an intact package.

Based on an evaluation of activity levels, ease of execution, personnel exposure, schedule constraints, disposal facility availability, and cost, segmentation of the internals may be postponed until after the fuel is removed from the SFP.

Removal of the reactor vessel follows the removal of the reactor internals and may not occur until after a SAFSTOR period. It is likely that the vessel would be removed by sectioning or segmenting. Vessel sectioning or segmenting will permit a substantial portion of the waste to be sent to a waste re-processor instead of a near surface disposal site. The dismantling of the drywell and suppression chamber would be undertaken as part of the reactor building demolition.

Finally, the vessel could be shipped to a burial site with at least a portion of the internals intact. The NRC has licensed such an approach for the Trojan facility [SECY-98-231 October 22, 1998].

F. Other Decommissioning Activities

Other decommissioning activities include site specific planning; the design, licensing and construction of an ISFSI, if needed; and site characterization. In addition to the major decommissioning activities listed above, the following would be accomplished:

- Millstone 1 systems shared with the other Millstone units will be separated by modification or reconfigured to permit operation by Unit 2 and 3.

- Hazardous and regulated materials (e.g., asbestos, lead, mercury, PCBs, oil, chemicals) will be identified during characterization and plans will be developed for the removal of these materials.

- Plant components will be removed from the Turbine Building including the Turbine Generator, Condenser, Feedwater Heaters, Moisture Separators and miscellaneous system and support equipment.

- Miscellaneous solid waste will be removed including: control rod blades, local power range monitors, spent resins and filters, the Reactor Pressure Vessel Head Insulation assembly, the de-tensioner platform, and the Refuel Floor shield plugs. The larger components may be segmented and packaged for removal through the Reactor Building hatchway. The Reactor Building crane may need to be modified to meet requirements for these tasks and to handle the spent fuel casks.

- Liquid wastes will be processed and discharged using plant procedures in accordance with applicable regulatory requirements as the liquid waste inventories become available. Initially the inventories of the plant water systems will be processed. Upon completion of the segmentation and packaging of the reactor vessel internals, the reactor cavity and reactor may be drained and the waste inventory processed. When the spent fuel has been removed, the SFP will be drained and the water processed. Systems will be isolated and deactivated in a sequence compatible with the operations previously described. Spent fuel pool systems will be isolated after removal of the spent fuel.

Radioactively contaminated or activated materials will be removed from the site as necessary to allow the site to be released for unrestricted access. Low level waste will be processed in accordance with plant procedures and existing commercial options, and sent to licensed disposal facilities or waste processors for further volume reduction. Wastes may be incinerated, compacted, or otherwise processed by authorized and licensed contractors, as appropriate. Mixed wastes are not expected to be generated during decommissioning. Existing mixed wastes, if any, will be managed according to all applicable federal and state regulations. Mixed waste will be

transported only by authorized and licensed transporters and shipped only to authorized and licensed facilities.

G. Storage of Spent Fuel

The spent fuel will initially be stored in the SFP. Millstone 1 is considering design and license of a dry, ISFSI. Should this occur, the fuel will be transferred and stored temporarily on site using licensed canisters. For the period of time when the fuel will be stored in the SFP, the systems necessary for SFP operations may be consolidated into an “Island” concept and configured for SFP clean-up and cooling.

Congress passed the "Nuclear Waste Policy Act" in 1982, assigning the responsibility for disposal of spent nuclear fuel created by the commercial nuclear generating plants to the Department of Energy (DOE). This legislation also created a Nuclear Waste Fund to cover the cost of the program, which is funded, in part, by the sale of electricity from the Millstone 1 plant. The current DOE estimate for startup of the federal Waste Management System is 2010. For planning purposes, Millstone 1 has assumed that the high-level waste repository or some interim storage facility will not be operational until at least 2010. Shipments of fuel and GTCC waste to DOE is planned to be directly from the ISFSI if needed.

Millstone will also continue to investigate alternative fuel storage options such as the Private Fuel Storage initiative in Utah and the Owl Creek Project in Wyoming. Should alternative cost-effective opportunities arise, a different fuel storage approach may be pursued.

H. Final Site Survey and Termination of License

Since Unit 1 and Unit 2 are contiguous and have common structural boundaries, the plans for building demolition and for the license termination survey are currently to be implemented as a coordinated evolution for the two units. Consequently, the schedule for the Millstone 1 license termination will be constrained by the need to terminate the Part 50 license coincident with that of Unit 2. The use of the Millstone 1 ventilation stack by Unit 2 and Unit 3 may delay license termination for Millstone 1 until the stack is no longer required or the “ownership” for the stack is turned over to Unit 3. As a result of this delay in requesting license termination, the final site survey using Reference 6 may proceed in two phases: 1) internal structures surveyed as decontamination and dismantlement is completed, and 2) external areas surveyed in conjunction with completion of the Unit 2 decontamination and dismantlement.

Millstone 1 will prepare a License Termination Plan (LTP), which will define the details of the final radiological survey to be performed once the decontamination activities are completed. The LTP will conform to the format defined in Reference 7 and will address the limits of 10CFR20 using the pathways analysis defined in Reference 6. Use of this guidance ensures that survey design and implementation are conducted in a manner that provides a high degree of confidence that applicable regulatory criteria are satisfied. Once the survey is complete, the results will be provided to the NRC in a format that can be verified.

I. Site Restoration

The restoration of the Unit 1 area of the Millstone site will be undertaken when the 10CFR Part 50 license for Unit 1 is terminated. This event may coincide with Unit 2 and Unit 3 license terminations. Buildings, structures, and other facilities which are not currently known to be radiologically contaminated, such as the Strainer Pit, Intake Structure, and the Discharge Structure, will be dismantled, or will have been dismantled, as part of the building demolition effort after the final license termination survey for Unit 1. These buildings can be removed late in the building demolition phase since there is no decommissioning operational need to remove them earlier. Site restoration requires that all buildings be removed to an elevation 3 feet below grade or to an elevation consistent with the removal of the necessary amounts of contaminated material.

Although not within the scope of NRC regulation, Millstone 1 is presently considering restoring the site to a condition comparable to a natural state. In addition to the below grade structures, buried utilities may remain in place and roofs of catch basins and manholes will be removed and the structures backfilled. Holes will be drilled in structure foundation mats, catch basins and manhole slabs to permit drainage and prevent the accumulation of water. Buried piping greater than 2 feet in diameter and tunnels will be removed and the trench backfilled or the crowns and roofs will be removed to an elevation 3 feet below grade and the facility will be backfilled. Areas on the site will be backfilled, graded, and landscaped.

IV. SCHEDULE FOR DECOMMISSIONING ACTIVITIES

Millstone 1 intends to pursue decommissioning utilizing a Modified SAFSTOR alternative. The schedule of decommissioning activities is attached as Figure IV-1. As discussed above, the actual schedule may vary in response to the availability of waste disposal facilities, economic resources, more detailed planning or unforeseen circumstances.

A. Planning and Preparation Period

Activities include site characterization, engineering evaluations and planning, development of procedures for dismantlement and disposal, design and procurement of special tools, and site preparation activities. Millstone 1 intends to complete these activities approximately 18 months after the initiation of decommissioning.

B. Decommissioning Operations and License Termination Period

Preliminary decommissioning activities will be performed such as the construction of temporary facilities (e.g., changing rooms, laydown areas, upgrading roadways), design and fabrication of special shielding and contamination control envelopes, and procurement of shipping containers and liners. Removal of NSSS components will be conducted for those systems and components not discussed above under the heading "Major Decommissioning Activities."

As discussed above, these activities may be split into two decontamination and dismantlement (D&D) periods: a selected decontamination and dismantlement period followed by a SAFSTOR period and then a final D&D period. Removal of the plant systems and components may take place as their functions are no longer needed and as they are identified as interference for large component removal. Removal of contaminated equipment and material from all contaminated areas can be scheduled for either D&D period. Specific decontamination of targeted building and facility areas will be scheduled at the most appropriate time to optimize worker dose reduction. Decontamination and dismantlement of the SFP and associated systems will take place once the spent fuel is moved to an ISFSI or transferred to DOE.

Final site survey and license termination occurs as discussed above under the heading "Final Site Survey and Termination of License."

C. SAFSTOR Period

If appropriate, activities at Millstone 1 may be reduced to those necessary to monitor the safe storage of spent fuel and maintain adequate radiation protection. Corrective maintenance will be performed as necessary on active systems and components including the Radiation Protection Monitoring system, the SFP systems and/or the ISFSI.

D. Site Restoration Period

Demolition of the remaining portions of the containment structure and interior portions of the reactor building will use commercial demolition techniques. Removal of remaining buildings and other site structures will also use commercial demolition techniques. Site areas affected by the

dismantling activities will be cleaned and the plant area graded as required to prevent ponding and inhibit the refloating of subsurface materials.

V. DECOMMISSIONING COST ESTIMATE

TLG Services, Inc. prepared a Millstone 1 decommissioning cost estimate in 1998. The methodology used by TLG to develop the decommissioning cost estimate follows the basic approach originally advanced by the Atomic Industrial Forum (now Nuclear Energy Institute) in their program to develop a standardized model for decommissioning cost estimates. The results of this program were published as AIF/NESP-036, A Guideline for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates [Reference 8]. This document presents a unit cost factor method for estimating direct activity costs, simplifying the estimating process. The unit cost factors used in the study reflect the latest available data at the time of the study concerning worker productivity during decommissioning including field experience. The current decommissioning cost estimate summarized in the following table uses updated information and data (relative to the 1998 estimate) to project the potential costs.

It should be noted that the estimating approach for the current estimate has changed from previously performed cost estimates. This estimate utilized an area based estimate methodology detailing descriptions and quantities of waste and the removal scheme on an area-by-area basis. This method more closely resembles system and component removal approaches. Previous cost estimates were performed using data on a system-by-system basis.

This estimate is a preliminary cost estimate. This decommissioning cost estimate is in 1999 dollars. 10CFR50.82(a)(8)(iii) requires that a site specific decommissioning cost estimate be prepared and submitted within two years following permanent cessation of operations. Following appropriate internal review and estimate refinement, a site specific cost estimate will be issued to the NRC.

The Modified SAFSTOR alternative provides for the opportunity to remove selected components prior to a SAFSTOR period. Dry spent fuel storage reduces the overall length of the decommissioning project and therefore, may reduce the overall cost. The assumptions about DOE's inability to take possession of spent fuel has made the decision to investigate dry spent fuel storage at Millstone 1 prudent. Consequently, the costs of siting, constructing and licensing, an independent spent fuel storage facility have also been considered.

Millstone 1 Summary of Decommissioning Costs
(Thousands of dollars)

Staffing	$155,595

LLW Burial and Processing	$ 27,259
License Termination	$ 12,204
Decontamination and Removal	$174,789
Decommissioning Planning Activities	$ 29,057
Other Costs (Note 1)	$133,170
Subtotal	$532,074
Spent Fuel Management (Note 2)	$159,607
Total Decommissioning Estimate	$691,681

Notes:
1. Other costs such as insurance, property taxes, energy, NRC and State fees, etc.
2. Includes disposition of greater than Class C waste.

VI. ENVIRONMENTAL IMPACTS

10CFR50.82(a)(4)(i) describes the PSDAR and requires that it include "a discussion that provides the reasons for concluding that the environmental impacts associated with the site-specific decommissioning activities will be bounded by appropriate, previously issued environmental impact statements." The following discussion provides our basis for drawing that conclusion and it is based on two previously issued documents:

1. NUREG-0586, "Final Generic Environmental Impact Statement (GEIS) On Decommissioning Nuclear Facilities" [Reference 1].

2. Millstone Nuclear Power Station Final Environmental Statement, Docket 50-245, 50-336, dated June, 1973 [Reference 4].

The decommissioning of Millstone 1 will have generally positive environmental effects, in that:

- Radiological sources that create the potential for radiation exposure to site workers and the public will be reduced.

- The intent of decommissioning is to return the site to a condition allowing unrestricted use.

The decommissioning of Millstone 1 will be accomplished with no significant adverse environmental impacts, in that:

- No Millstone 1 site specific factors should alter the conclusions of the GEIS or the Millstone Environmental Statement.

- Radiation dose to the public will be minimal.

- Radiation dose to decommissioning workers will be a fraction of the operating dose.

- The low-level radioactive waste removed from the site will occupy a small portion of the burial volume at approved waste disposal sites.

- The non-radiological environmental impacts are temporary and not significant.

The effects of decommissioning activities with respect to specific environmental issues are discussed below.

A. Radiation Dose to the Public

Radiation dose to the public will be maintained below comparable levels when the plant was operating through the continued application of radiation protection and contamination controls combined with the reduced source term available in the facility.

B. Occupational Radiation Exposure

The occupational dose exposure for decommissioning Millstone 1 will be less than described in the GEIS because of two main reasons. First, Millstone 1 initiated a zinc injection program in 1987 that significantly reduced the buildup of contaminated corrosion products during the remaining plant operation period. Second, with the plant shutdown since 1995, natural decay of leading radionuclides will have reduced overall plant general dose levels significantly by the time D&D activities occur. The activities identified in Section III and the initial schedule (Section IV) resembles the DECON option. Therefore, the Modified SAFSTOR occupational and public dose exposure is compared to the DECON option dose in the GEIS. The occupational and public dose effects for a Modified SAFSTOR alternative are bounded by the DECON option. A total of 16.10 person-Sv (1610 person-rem) is estimated for decommissioning of Millstone 1 using a Modified SAFSTOR approach. The exposure from decontamination and dismantlement activities and the exposure during

transportation of the low-level wastes is included in this dose estimate. NUREG-0586 [Reference 1], Table 5.3-2, estimates a total occupational dose of 18.74 person-Sv (1874 person-rem) for the DECON alternative for the reference BWR plant.

C. Low-Level Radioactive Waste Burial Volume

The GEIS [Reference 1] estimate for low-level waste disposal from a referenced BWR is 18,975 cubic meters (669,817 cubic feet) for both the DECON and SAFSTOR options. Millstone 1 estimates the low-level waste burial volume, would be 18,014 cubic meters (635,900 cubic feet) for the Modified SAFSTOR alternative. This includes, by a reduction of approximately 40 percent (industry standard), the utilization of present-day volume reduction techniques. For waste requiring deep geological burial, i.e., greater than Class C (GTCC) waste, Millstone 1 estimates that the volume will be at or below the 11.5 cubic meters anticipated for a reference BWR in the GEIS. These estimates support the conclusion that the previously issued environmental statements are bounding since the disposal of waste will require fewer resources, i.e., less waste disposal facility area, than what was considered in the GEIS.

D. Non-Radiological Environmental Impacts

The non-radiological environmental impacts from the Millstone 1 decommissioning are temporary and not significant. The largest occupational risk associated with the decommissioning is the risk of industrial accidents. This risk will be minimized by adherence to work controls during decommissioning similar to the procedures followed during power operation. Procedures controlling work related to asbestos, lead, and other non-radiological hazards will also remain in place during the decommissioning. The primary environmental effects of the decommissioning are temporary and include small increases in noise levels and dust in the immediate vicinity of the site, and small increases in truck traffic to and from the site for hauling equipment and waste. These effects will be similar to those experienced during normal refueling outages and certainly less severe than those present during the original plant construction. No significant socioeconomic impacts or impacts to local culture, terrestrial or aquatic resources have been identified.

E. Additional Considerations

While not quantitative, the following considerations are also relevant to concluding that decommissioning activities will not result in significant environmental impacts not previously reviewed:

- The release of effluents will continue to be controlled by plant license requirements and plant operating procedures throughout the decommissioning.

- With respect to radiological releases, Millstone 1 will continue to operate in accordance with the Offsite Dose Calculation Manual during decommissioning.

- Releases of non-radiological effluents will continue to be controlled per the requirements of the NPDES and State of Connecticut permits.

- Systems used to treat or control effluents during power operation will either be maintained or replaced by temporary or mobile systems for the decommissioning activities.

- Radiation protection principles used during plant operations will remain in effect during decommissioning to ensure that protective techniques, clothing, and breathing apparatus are used as appropriate.

- Sufficient decontamination and source term reduction prior to dismantlement will be performed to ensure that occupational dose and public exposure will not exceed those estimated in the Final Generic Environmental Impact Statement [Reference 1].

- Detailed site radiological surveys will be performed prior to starting the waste campaigns to confirm the burial volume of low-level radioactive waste and highly activated components which require deep geological disposal.

- Transport of radioactive waste will be in accordance with plant procedure, applicable Federal regulations, and the requirements of the receiving facility.

- Plant ventilation systems, or alternate, temporary systems, will be maintained as long as needed in areas they service.

- Site access control during decommissioning will ensure that residual contamination is minimized or eliminated as a radiation release pathway to the public.

F. Conclusion

Based on the above discussions, Millstone 1 concludes that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate, previously issued environmental impact statements. Should unforeseen circumstances arise that may exceed

a bounding environmental impact, Millstone will seek prior NRC review and approval before proceeding.

VII. REFERENCES

1. USNRC, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," NUREG-0586, August, 1988.

2. USNRC, “Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities,” NUREG-1496, Volume 1, July 1997.

3. H.D. Oak et al., “Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station,” NUREG/CR-0672 (Prepared for the U.S. NRC by Pacific Northwest Laboratory, Richland Washington), June 1980 (Addendum 1, July 1983; Addendum 2, September 1984; Addendum 3, July 1988; Addendum 4, December 1990).

4. Millstone Nuclear Power Station Final Environmental Statement, Docket 50-245, 50-336, dated June, 1973.

5. B17388, NNECO letter to NRC, "Certification of Permanent Cessation of Power Operations and that Fuel Has Been Permanently Removed From the Reactor," dated 7/21/98.

6. USNRC, NUREG-1575, “Multi-Agency Radiation Site Survey and Investigation Manual (MARSSIM),” (Final Report).

7. USNRC, NUREG-1700, “Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans” (Currently in Draft for Comment Form).

8. AIF/NESP-036, A Guideline for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates.